What is claimed is:

1. An RF passive circuit comprising:

a semiconductor substrate;

a spiral inductor which is formed on a main surface of the semiconductor substrate;

a via-hole which is formed at a position adjacent to the spiral inductor by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on the metal film; and

a wiring metal layer which is formed on the dielectric layer and holds a capacitor between the via-hole;

wherein one end of the spiral inductor extends to be connected with the wiring metal layer.

2. The RF passive circuit of Claim 1,

wherein the spiral inductor has a double layer structure having an upper wiring metal layer and a lower wiring metal layer, where at least one of the wiring metal layers is in a spiral pattern, and where the wiring metal layers are connected to each other, with a contact hole therebetween.

3. An RF choke used in at least one of a matching circuit and a bias feeding circuit, both circuits being included in an RF amplifier, the RF choke comprising:

a semiconductor substrate where at least one of the matching circuit and the bias feeding circuit is incorporated;

a spiral inductor which is formed on a main surface of the semiconductor substrate;

a via-hole which is formed at a position adjacent to the spiral inductor by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on the metal film; and

a wiring metal layer which is formed on the dielectric layer and holds a capacitor between the via-hole,

wherein one end of the spiral inductor extends to be connected with the wiring metal layer.

4. An RF passive circuit comprising:

a semiconductor substrate;

a spiral inductor which is formed on a main surface of the semiconductor substrate;

a via-hole which is formed at a position adjacent to

the spiral inductor by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first wiring metal layer which is formed on a first dielectric layer and equivalently forms a first capacity element between the via-hole; and

a second wiring metal layer which is formed on the first wiring metal layer with a second dielectric layer therebetween, and equivalently forms a second capacity element between the first wiring metal layer,

wherein the via-hole and the second wiring metal layer are electrically connected to be able to hold a static capacity determined by a sum of the first capacity element and the second capacity element,

and wherein one end of the spiral inductor further extends so as to be electrically connected to the first wiring metal layer.

5. The RF passive circuit of Claim 4,

wherein the spiral inductor has a double layer structure having an upper wiring metal layer and a lower wiring metal layer, where at least one of the wiring metal layers is in a spiral pattern, and where the wiring metal layers are connected to each other, with a contact hole

therebetween.

6. An RF choke used in at least one of a matching circuit and a bias feeding circuit, both circuits being included in an RF amplifier, the RF choke comprising:

a semiconductor substrate where at least one of the matching circuit and the bias feeding circuit is incorporated;

a spiral inductor which is formed on a main surface of the semiconductor substrate;

a via-hole which is formed at a position adjacent to the spiral inductor by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first wiring metal layer which is formed on a first dielectric layer and equivalently forms a first capacity element between the via-hole; and

a second wiring metal layer which is formed on the first wiring metal layer with a second dielectric layer therebetween, and equivalently forms a second capacity element between the first wiring metal layer,

wherein the via-hole and the second wiring metal layer are electrically connected to be able to hold a static capacity determined by a sum of the first capacity element

and the second capacity element,

and wherein one end of the spiral inductor further extends so as to be electrically connected to the first wiring metal layer.

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7. An RF passive circuit comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a wiring metal layer which is formed on a main surface of the semiconductor substrate and is electrically connected to the via-hole; and

an inductor which is made of a metal film in a spiral pattern and is formed on ~~the~~ a first wiring metal layer with a dielectric layer therebetween.

8. The RF passive circuit of Claim 7,

wherein the first wiring metal layer is in the same parallel pattern as the inductor.

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9. An RF choke used in at least one of a matching circuit and a bias feeding circuit, both circuits being included in an RF amplifier, the RF choke comprising:

a semiconductor substrate where at least one of the matching circuit and the bias feeding circuit is incorporated;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a wiring metal layer which is formed on a main surface of the semiconductor substrate and is electrically connected to the via-hole; and

an inductor which is made of a metal film in a spiral pattern and is formed on the first wiring metal layer with a dielectric layer therebetween.

10. An RF passive circuit comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on a main surface of the semiconductor substrate so as to cover the metal film; and

an inductor which is a spirally-formed metal layer formed on the dielectric layer, which forms a static capacity where one part thereof faces the metal film of

the via-hole.

11. An RF choke used in at least one of a matching circuit and a bias feeding circuit, both circuits being included in an RF amplifier, the RF choke comprising:

a semiconductor substrate where at least one of the matching circuit and the bias feeding circuit is incorporated;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on a main surface of the semiconductor substrate so as to cover the metal film; and

an inductor which is a spirally-formed metal layer formed on the dielectric layer, which forms a static capacity where one part thereof faces the metal film of the via-hole.

12. An RF passive circuit comprising:

a semiconductor substrate;

a dielectric layer which is formed on a first main surface of the semiconductor substrate;

a via-hole which is formed by applying a metal film

on an inside wall of a hole provided through a second main surface of the semiconductor substrate until the hole reaches the dielectric layer; and

a metal layer formed on the dielectric layer which holds a static capacity between the metal film of the via-hole and the metal layer.

13. The RF passive circuit of Claim 12, further comprising:

a resistance element whose one terminal is electrically connected to the metal layer, and the other terminal to the via-hole.

14. An RF amplifier comprising:

a semiconductor substrate;

a dielectric layer which is formed on a first main surface of the semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through a second main surface of the semiconductor substrate until the hole reaches the dielectric layer;

a metal layer formed on the dielectric layer which holds a static capacity between the metal film of the via-hole and the metal layer; and

a field effective transistor, mounted on the semiconductor substrate, which has a common gate circuit having a gate terminal electrically connected to the metal layer.

15. An RF amplifier comprising:

a semiconductor substrate;

a dielectric layer which is formed on a first main surface of the semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through a second main surface of the semiconductor substrate until the hole reaches the dielectric layer;

a metal layer formed on the dielectric layer which holds a static capacity between the metal film of the via-hole and the metal layer; and

a bipolar transistor, mounted on the semiconductor substrate, which has a common base circuit having a base terminal electrically connected to the metal layer.

16. An RF amplifier comprising:

a semiconductor substrate;

a dielectric layer which is formed on a first main surface of the semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through a second main surface of the semiconductor substrate until the hole reaches the dielectric layer;

a metal layer formed on the dielectric layer which holds a static capacity between the metal film of the via-hole and the metal layer;

a resistance element whose one terminal is electrically connected to the via-hole and the other terminal to the metal layer; and

a field effective transistor mounted on the semiconductor substrate whose source terminal is connected to the other terminal of the resistance element connected to the metal layer, so as to form a self bias circuit.

17. An RF passive circuit comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on an inside wall of the via-hole; and

a wiring metal layer formed on the dielectric layer, which holds a static capacity between the via-hole.

18. The RF passive circuit of Claim 17, further comprising:

a resistance element whose one terminal is electrically connected to the metal film of the via-hole, and the other terminal to the wiring metal layer.

19. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on an inside wall of the via-hole;

a wiring metal layer formed on the dielectric layer, which holds a static capacity between the via-hole; and

a field effective transistor, mounted on the semiconductor substrate, which has a common gate circuit having a gate terminal electrically connected to the wiring metal layer.

20. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the

semiconductor substrate;

a dielectric layer which is formed on an inside wall of the via-hole;

a wiring metal layer formed on the dielectric layer, which holds a static capacity between the via-hole; and

a bipolar transistor, mounted on the semiconductor substrate, which has a common base circuit having a base terminal electrically connected to the wiring metal layer.

21. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a dielectric layer which is formed on an inside wall of the via-hole;

a wiring metal layer formed on the dielectric layer, which holds a static capacity between the via-hole;

a resistance element whose one terminal is electrically connected to the metal film of the via-hole and the other terminal to the metal layer; and

a field effective transistor mounted on the semiconductor substrate whose source terminal is connected to the other terminal of the resistance element connected

to the metal layer, so as to form a self bias circuit.

22. An RF passive circuit comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first dielectric layer which is formed on an inside wall of the via-hole;

a first wiring metal layer formed on the first dielectric layer which equivalently forms a first capacity element between the via-hole;

a second dielectric layer which is formed on the first wiring metal layer; and

a second wiring metal layer formed on the second dielectric layer which equivalently forms a second capacity element between the first wiring metal layer,

wherein the via-hole and the second wiring metal layer are electrically connected, and the sum of static capacity of the first capacity element and the second capacity element are held between the via-hole and the first wiring metal layer.

23. The RF passive circuit of Claim 22, further

comprising:

a resistance element whose one terminal is electrically connected either to the second wiring metal layer or to the via-hole, and the other terminal to the first wiring metal layer.

24. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first dielectric layer which is formed on an inside wall of the via-hole;

a first wiring metal layer formed on the first dielectric layer which equivalently forms a first capacity element between the via-hole;

a second dielectric layer which is formed on the first wiring metal layer;

a second wiring metal layer formed on the second dielectric layer which equivalently forms a second capacity element between the first wiring metal layer,

the via-hole and the second wiring metal layer being electrically connected, and the sum of static capacity of the first capacity element and the second capacity element

being held between the via-hole and the first wiring metal layer; and

a field effective transistor, mounted on the semiconductor substrate, which has a common gate circuit having a gate terminal electrically connected to the first wiring metal layer.

25. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first dielectric layer which is formed on an inside wall of the via-hole;

a first wiring metal layer formed on the first dielectric layer which equivalently forms a first capacity element between the via-hole;

a second dielectric layer which is formed on the first wiring metal layer;

a second wiring metal layer formed on the second dielectric layer which equivalently forms a second capacity element between the first wiring metal layer,

the via-hole and the second wiring metal layer being electrically connected, and the sum of static capacity of

the first capacity element and the second capacity element being held between the via-hole and the first wiring metal layer; and

a bipolar transistor, mounted on the semiconductor substrate, which has a common base circuit having a base terminal electrically connected to the first wiring metal layer.

26. An RF amplifier comprising:

a semiconductor substrate;

a via-hole which is formed by applying a metal film on an inside wall of a hole provided through the semiconductor substrate;

a first dielectric layer which is formed on an inside wall of the via-hole;

a first wiring metal layer formed on the first dielectric layer which equivalently forms a first capacity element between the via-hole;

a second dielectric layer which is formed on the first wiring metal layer;

a second wiring metal layer formed on the second dielectric layer which equivalently forms a second capacity element between the first wiring metal layer,

the via-hole and the second wiring metal layer being

electrically connected, and the sum of static capacity of the first capacity element and the second capacity element being held between the via-hole and the first wiring metal layer;

a resistance element whose one terminal is electrically connected either to the second wiring metal layer or to the via-hole, and the other terminal to the first wiring metal layer; and

a field effective transistor mounted on the semiconductor substrate whose source terminal is connected to the one terminal of the resistance element connected either to the second wiring metal layer or to the via-hole, so as to form a self bias circuit.

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